



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/945,393	08/30/2001	Eugene P. Marsh	MI22-1728	3193
21567	7590	01/20/2006	EXAMINER	
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			FOURSON III, GEORGE R	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 01/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/945,393	<b>Applicant(s)</b> MARSH, EUGENE P.	
	<b>Examiner</b> George Fourson	<b>Art Unit</b> 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 November 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7,20-24,26,27,35,45-49 and 53-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-24,26,27,35 and 45-49 is/are allowed.
- 6) ☒ Claim(s) 1-7,36-38 and 53-56 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

This office action is made non-final in view of the new grounds of rejection of claims 53-56 below.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 53,54,55 and 56 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no description in the disclosure as originally filed of forming 3 layers of dielectric material comprising different metals.

Claims 1-7,36-38 and 53-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raaijmakers et al.

Raaijmakers et al exemplifies formation of tantalum oxide and tantalum pentoxide alternating layers by atomic layer deposition including formation of monolayers, chemisorption and annealing [0044]-[0124+] to produce a high-k capacitor dielectric, Raaijmakers et al discloses alternating monolayers of different metal oxides including forming a further dielectric layer on such a layer and including additional chemistries in each cycle [0055-0063] The reference discloses different ratios of different metals and binary

cycles [0069]. The reference exemplifies formation of tantalum oxide and zirconium oxide [0072-0075][0106][0123-0124]). The reference exemplifies only two other metals – aluminum and titanium (tables I-VI). See [0057] where formation of a thinner layer 115 followed by further dielectric layers deposited by a similar ALD process is disclosed. See [0069] where different ratios of the different metals of a ternary dielectric is disclosed. See [0117] where it is disclosed that the process can be used to produce a slight doping effect as desired, See [0127] where it is disclosed that the process can be used to form dielectric stacks with enhanced dielectric properties and more stable structure (also see [0121]).

It would have been within the scope of one of ordinary skill in the art to form the recited alternating monolayers of tantalum oxide and zirconium oxide wherein the monolayers are evenly dispersed or dispersed as desired to produce a particular dielectric constant of the resulting dielectric layer in view of the disclosed suitability of tantalum containing and zirconium containing source gases as the metal source gases and the discussion related to use of different amounts of each component such as in creating a “slight doping effect”.

In view of the disclosure that the amount of metals in the mixed metal oxide formed can be varied and that one of the aims of the variation is to produce dielectric stacks with enhanced dielectric properties, the same goal as that of applicant, one of ordinary skill in the art would have been led to the recited amounts of metal oxides in the dielectric stack produced.

Applicant argues that the reference fails to disclose the limitations of claim 53. However, the rejection is based on 35 USC § 103. The reference is not alleged to disclose those limitations.

Applicant argues that the reference fails to disclose the annealed dielectric material exhibiting certain properties recognized by applicant. However, it is not necessary for the reference to disclose that

the process of the reference is performed to achieve the same goals as applicant or to obtain the same advantages recognized by applicant. It is sufficient that the process suggested by the reference is encompassed by the instant claims.

Applicant argues that the reference does not disclose forming 3 layers comprising different metals as recited in claim 53. Applicant is directed to the statement of the rejection above and especially [0069] and [0117] of the reference.

Applicant argues that the reference fails to disclose applicant's particular recited composition range. However, as stated above the rejection is based on 35 USC § 103. The reference is not alleged to disclose those limitations.

Applicant argues that the reference does not disclose that one of ordinary skill in the art would have had a reasonable expectation of success in obtaining the properties recognized by applicant. However, it is not necessary that the reference contain such a teaching. One of ordinary skill in the art would have had a reasonable expectation of success in producing a useful dielectric layer and would have been motivated to arrive at the recited composition to achieve desired "enhanced dielectric properties" in view of the guidance provided by the reference related to slight doping effect among the other teachings pointed to above. Applicant does not appear to argue that the results disclosed in the instant specification are unexpected.

Contrary to applicant's assertion the rejection is not based solely on the argument that one of ordinary skill in the art would not be required to perform undue experimentation to arrive at the recited mixed metal oxides. However, this is a necessary component of a valid rejection under 35 USC § 103. The rejection is based on the argument that one of ordinary skill in the art would have been led to the recited compositions through routine experimentation as opposed to undue experimentation and would

Art Unit: 2823

have had a reasonable expectation of success in producing a useful dielectric layer in view of the guidance provided by the reference.

Claims 20-24,26,27,35 and 45-49 are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Fourson whose telephone number is (571)272-1860. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



George Fourson  
Primary Examiner  
Art Unit 2823

GFourson  
January 13, 2006